

"Express Mail" Mailing Label No. EL 521 771 238 US  
Date of Deposit: July 30, 2001

## **SYSTEM AND METHOD FOR REMOTELY MONITORING MODEM STATUS**

### **Background of the Invention**

[0001] The use of modems for data communication over a cellular network is becoming more and more popular. As people use personal digital systems (PDA), portable laptops, and other systems, they desire to send data from these systems across the cellular network. One way of implementing these systems is to use a modem unit associated with each of these host processor units. When a company owns a large number of mobile units, it can be difficult to keep track of the status of these mobile units. For this reason it is desired for a user at a central location to obtain status information for a number of mobile units in the field.

### **Summary of the Invention**

[0002] The present invention is a system in which a computer is operably connected to the network. The network has software adapted to track the status of multiple modem units. The software allows for the production of status checks to be sent to the multiple modem units. The modem units are adapted to receive status check messages across the cellular network. The modem units are associated with host processors. The modem units reply with status information without being controlled by the host processors. Using this method, a user at a terminal can determine the status and general location of a number of modem units. In a preferred embodiment, the computer sends out a status request which goes through the network and is transmitted across the cellular network to each of the modem units. The modem units receive the status checks and then produce

status information to be sent across the cellular network back to the original computer. In a preferred embodiment, the status check and information are sent in User Datagram Protocol (UDP) packets so that the modem units themselves do not need to implement a full Transmission Control Protocol/Internet Protocol (TCP/IP) stack. The modem checks are done by using the connectionless UDP standard.

[0003] In a preferred embodiment, the computer is connected across the Internet to a server. The server is connected to a cellular network to send the status checks to the modem units and receive modem information from the modem units.

[0004] Being able to track more than one modem unit at a central location is quite useful for large companies that have a number of modem units in the field. Additionally, since the modem unit can respond without being instructed by the host processor, the modem units associated with a variety of types of host processors can be tracked. The modem units do not require the host processor itself be turned on at a given time in order to respond.

#### Brief Description of the Drawing Figures

[0005] Fig. 1 is a diagram illustrating the system of the present invention.

[0006] Fig. 2 is a diagram illustrating one embodiment of firmware for a modem unit of the present invention.

[0007] Fig. 3 illustrates one diagram of a system emphasizing a Group Watcher program at a computer.

[0008] Fig. 4 illustrates a UDP packet containing modem status data which can be sent to the computer program in one embodiment of the present invention.

#### Detailed Description of the Invention

[0009] Fig. 1 illustrates System 20 of the present invention. System 20 includes a computer 22 with a software program 24. The software program 24 is used to

keep track of multiple modem units. The computer 22 is connected across the Internet 23 to server 26. The server 26 is connected across telephone network 28 to cell phone transmitters 30 and 32. Note that a variety of cell phone transmitters can be connected in the system of the present invention. Cell phone transmitters 22 are in wireless communication with modem units 34, 36 and 38. Modem units 34, 36 and 38 are associated with host processors 40, 42 and 44.

[0010] In the system of the present invention, program 24 loaded on the personal computer 22 allows for the production of modem status requests, which are sent across the cellular network to the modem units 34, 36 and 38. These requests preferably indicate the addresses for the host processors from which status information is to be obtained. The modem units 34 includes firmware 46, which allows it to detect the modem requests as being identified for that modem and to construct modem status signals, which can be transmitted by the modem unit 34 back to the cell phone transmitter.

[0011] In one embodiment, the server 26 is used to filter the request at the program 24 at the personal computer. Thus, only those authorized requests are transmitted across the cellular network. In one embodiment, server 26 filters the responses and make sure that only the status data that are authorized are sent to the Group Watcher program 24 at the personal computer 22. Alternately, this information-filtering function is done by a cell phone network.

[0012] Fig. 2 illustrates one example of firmware 46 primed for use in the modem units of the present invention. In this system, the received data is processed in unit 50 and sent to the host processor. A unit 52 checks for an external status modem object (MOB) request and does identification to make sure this external MOB request identifies the host modem unit. If it does, an MOB response is constructed using data stored in the modem status memory 54. Thus, the modem unit 34 can identify modem status requests and produce modem status information signals to be sent out to the cell phone receiver and thus back to the computer program running on the personal computer. Status information can

include up and running information, signal strength information, network parameters and cell ID information. Note that the same modem status memory 54 can be used to construct local MOB responses in using unit 56. The local requests or MOB requests are requests from the host processor. MOB is one example of a modem status protocol, but other protocols can also be used. Note that the production of the status responses to be sent to the cell phone units do not require control by the host processor, but are done in the modem unit. This allows modem status to be sent when the host processor is turned off and the status response does not depend upon the host processor, so that the different varieties of host processors will not interfere with the production of the modem status information that is sent to the central computer.

[0013] Fig. 3 illustrates a multiple modem status program 60. In this case this program 60 includes a display 62 constructed using the modem status information. The modem status is a variety of modem units. Note that in this case five modem units associated with different cell phone transmitter receivers receive the request and respond to the modem status request with the status information. This status information is collected at the program 60 and displayed in display 62.

[0014] Fig. 4 illustrates a UDP packet for one embodiment of the present invention, wherein the modem data is stored in the UDP packet. By using a UDP packet, a full TCP/IP stack at the modem unit need not be provided. The connectionless UDP service simplifies the receiving of the status request, and the production of the status information by the modem unit, by running the UDP protocol over IP, avoids the more computational complex requirements of the TCP protocol.

[0015] Details of one embodiment of a system of the present invention are shown in Appendix I attached hereto.

[0016] It will be appreciated by those of ordinary skill in the art that the invention can be implemented in other specific forms without departing from the spirit or character thereof. The presently disclosed embodiments are therefore

considered in all respects to be illustrative and not restrictive. The scope of the invention is illustrated by the appended claims rather than the foregoing description, and all changes that come within the meaning and range of equivalents thereof are intended to be embraced herein.